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Institut Català de Recerca per a la Governança del Mar

Report on the marine litter collected by bottom trawlers in Catalonia

2025



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This report contains information on the marine litter fraction of the catch of the bottom trawl fleet of the northern GSA 6, gathered through ICATMAR's fisheries monitoring program.

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Introduction and Methods

The Catalan Research Institute for the Governance of the Sea (ICATMAR) has developed, in the frame¬work of the 2030 Maritime Strategy of Catalonia, a monitoring program in collaboration with the commer¬cial bottom trawling fleet to characterize all fractions of the catch, including marine litter. Data collection began in 2018 and will continue to offer the data needed to sustain fisheries and improve management plans. This report presents the data collected and analyzed throughout the year 2025, comparing the results with those of the previous four years, to provide an overview of the marine litter fraction of the catch passively caught by bottom trawlers in the Catalan coast.

Bottom trawl

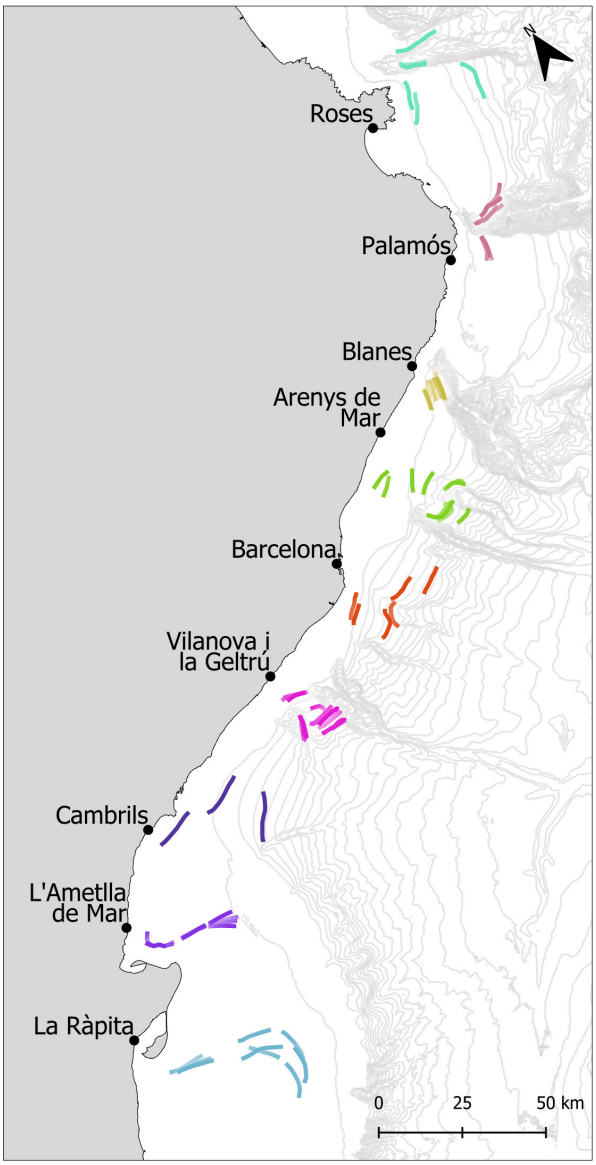


Figure 1. Study area and main fishing ports of ICATMAR bottom trawl fisheries monitoring program in the Northern GSA 6 in 2025.

Data on catch composition for the bottom trawl fishery are shown by port for each of the nine ports sampled. The object of study is macro-benthic marine litter, in other words, the debris big enough to be caught by the bottom trawling fleet which is accu¬mulated on the seafloor. The Catalan coast was divided in the three defined provinces, i.e., Girona, Barcelona and Tarragona, with a total of 9 base ports sampled, with three ports representing each province. From north to south, the ports were Roses, Palamós, Blanes, Arenys de Mar, Barcelona, Vilanova i la Geltrú, Tarragona (replaced by Cambrils in 2025), L'Am¬etlla de Mar and La Ràpita (Figure 1). Each zone was sampled monthly with a quarterly frequency per port.

All fishing surveys comprised a total of 3 hauls, each at different depth strata, included in the following classification: Coastal Delta shelf (<40m), middle Delta shelf (40-75m) (these two exclusive to the Delta de l'Ebre region), coastal shelf (50-75m), deeper shelf (75 - 200m), upper slope (200 - 500m) and lower slope (500 - 800m). Each haul was GPS-recorded with a start and an end point, fishing time and gear width. These measurements allowed the calculation of the fishing area to standardize marine litter catches for comparison. The total catch, or a fraction in the case of a very abundant catch, was taken to the Institut de Ciències del Mar (ICM-CSIC) laboratory to classify and weigh (wet) all marine litter caught in the nets, as described in Table 1. Details on the methodology can be found in ICATMAR 26-04.

Table 1: Classification of the marine litter categories in the laboratory.

Category	Description
Metal	Items or pieces made with ferrous and non-ferrous metals, i.e. cans, lids
Plastic	Items or pieces made with plastic, i.e., bags, containers, including sanitary and hygienic waste such as wet wipes
Rubber	Items or pieces made with rubber, i.e., balloons, boots, tires
Textiles	Clothes and pieces of fabric
Wood	Items and pieces made with wood, i.e., corks, boxes or poles
Other waste	All other marine litter which does not fit in the specific categories, i.e., batteries

Clinker, the residue from coal-burning steamships, has been described in the Mediterranean Sea and is incidentally caught by bottom trawler nets. Although its presence may provide evidence of historical steamship activity in the area, clinker is no longer manufactured. Therefore, this category has been removed from the data analysis as it may outweigh the importance of current pollutant items such as plastics.

Marine litter from the bottom trawl fishery in Catalonia

In 2025, a total of 80 bottom trawl sampling hauls were conducted. Of the total catch, 3% was natural debris mass and 1% was marine litter (Figure 2). Within the marine litter fraction, the main identifiable category was plastic, as seen in Figure 3. This is consistent with findings from previous years, which also identified plastics as the most abundant category, with the exception of 2024, when metal was the predominant category due to the presence of a large metallic dumpster in one of the hauls (ICATMAR 25-09).

For the period of 2021-2024, the average marine litter was of 2% of the total catch (Figure 2). Of all marine litter, plastic was the most abundant category (Figure 3). For detailed data on the marine litter mass standardized by squared kilometer see Table 2.

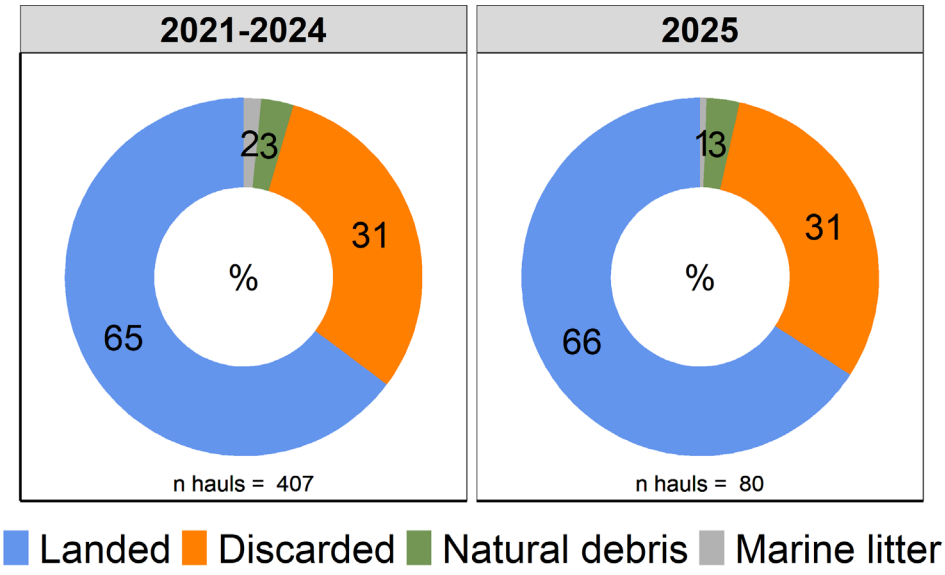


Figure 2. Catch composition in Catalonia. Percentage by weight of landings, discarded, natural debris and marine litter.

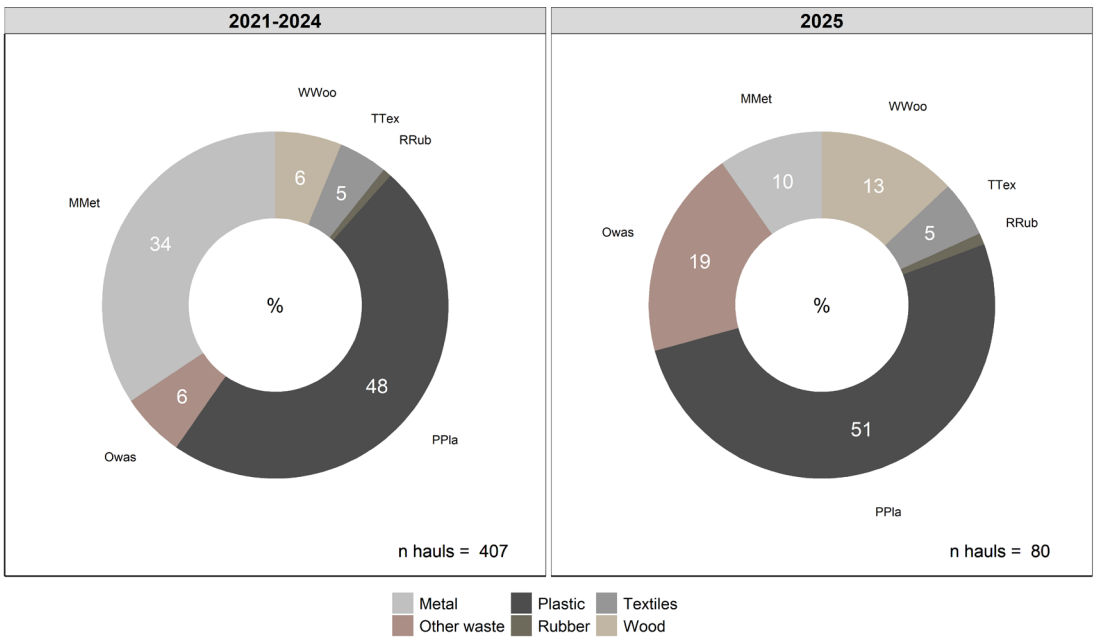


Figure 3. Categories of marine litter by mass including all hauls within each period.

Table 2. Marine litter mass for the previous 4 years (2021-2024) and for the year analyzed (2025). SE: standard error.

Marine litter mass (kg km^{-2})	2021-2024		2025	
Type	Mean	SE	Mean	SE
Plastic	3.96	0.61	1.89	0.34
Wood	0.51	0.12	0.48	0.31
Textiles	0.38	0.05	0.19	0.08
Metal	2.83	2.56	0.36	0.33
Rubber	0.07	0.03	0.04	0.04
Other waste	0.49	0.13	0.71	0.37

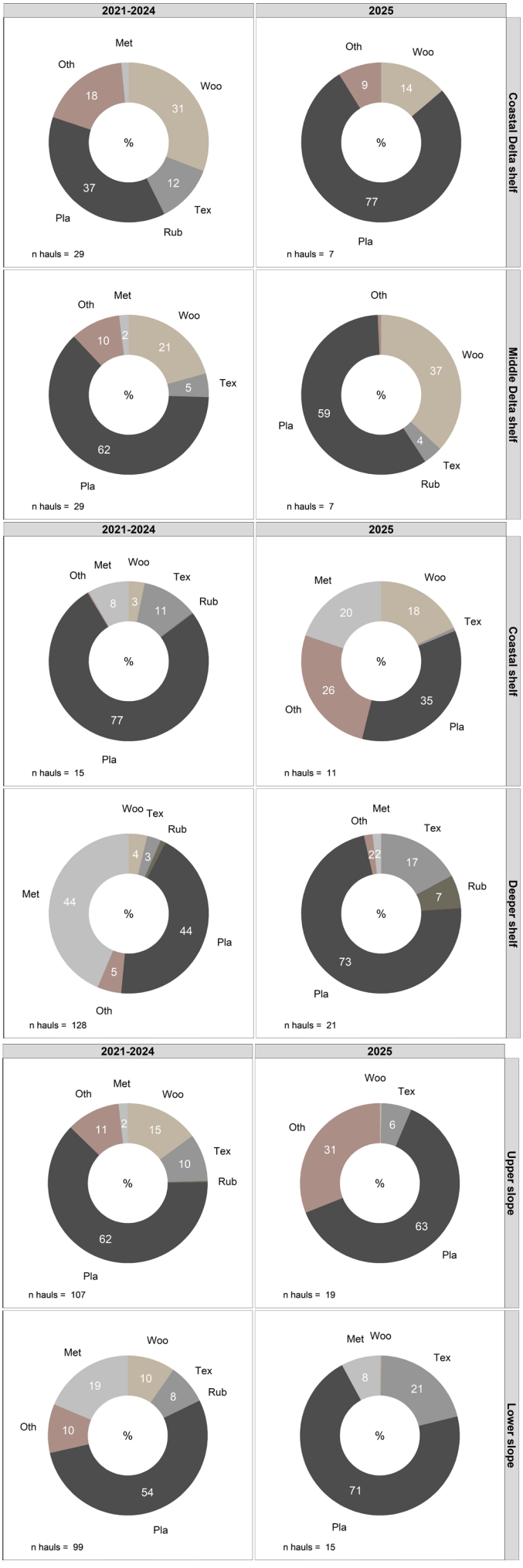
Marine litter composition by depth and zone

When analyzing the composition of marine litter at different depths, plastic was the category that accounted for the highest proportion in all strata in 2025 (Figure 4). Wood is another relevant category in terms of mass, especially in the coastal and middle Delta shelves, as this type of items are heavy (Balcells et al., 2023). Accordingly, the results obtained for the previous years (2021-2024) are similar except for the deeper shelf, in which metal was very abundant. This seems to be an exception caused a big metallic dumpster was fished in one haul and its big weight masks the weight of the plastic fraction. For detailed data on the marine litter mass standardized by squared kilometer by depth see Table 3.

The composition of marine litter by zone, corresponding to the three administrative provinces, is presented in Figure 5. Consistent with previous years, plastic was the most frequently collected litter category across all zones in 2025. However, Girona exhibited the lowest proportion of plastic litter in 2025, with plastics accounting for 39% of the total marine litter mass, compared with 89% in Barcelona and 63% in Tarragona, results are consistent with previously reported in Blanco et al. 2025. These proportions are broadly consistent with those observed during the 2021–2024 period, except in Girona, where metal represented the largest share of the total mass. This difference was driven by the large metallic dumpster recovered in one of the hauls in Blanes, as previously mentioned. For detailed data on the marine litter mass standardized by squared kilometer by depth see Table 4.

Table 3. Marine litter mass for the previous 4 years (2021-2024) and for the year analyzed (2025) by depth. SE: standard error.

2021-2024 Marine litter mass (kg km^{-2})	Coastal Delta shelf		Middle Delta shelf		Coastal shelf		Deeper shelf		Upper slope		Lower slope	
Type	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Plastic	1.26	0.36	1.20	0.36	8.72	2.25	8.63	1.84	1.66	0.26	1.42	0.34
Wood	1.04	0.77	0.40	0.24	0.37	0.20	0.73	0.30	0.40	0.14	0.26	0.12
Textiles	0.40	0.19	0.09	0.06	1.30	0.55	0.56	0.11	0.26	0.06	0.22	0.08
Metal	0.05	0.03	0.04	0.02	0.95	0.76	8.57	8.27	0.05	0.02	0.49	0.46
Rubber	0.00	0.00	0.00	0.00	0.02	0.02	0.21	0.11	0.01	0.00	0.00	0.00
Other waste	0.62	0.39	0.19	0.11	0.03	0.02	0.95	0.39	0.29	0.10	0.26	0.14
2025 Marine litter mass (kg km^{-2})	**Coastal Delta shelf**		**Middle Delta shelf**		**Coastal shelf**		**Deeper shelf**		**Upper slope**		**Lower slope**	
Type	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Plastic	0.91	0.40	2.49	1.63	4.53	0.99	1.56	0.68	1.89	0.68	0.43	0.17
Wood	0.16	0.11	1.57	1.57	2.34	2.07	0.00	0.00	0.01	0.01	0.00	0.00
Textiles	0.00	0.00	0.17	0.17	0.09	0.09	0.37	0.27	0.18	0.14	0.13	0.11
Metal	0.00	0.00	0.00	0.00	2.55	2.44	0.04	0.04	0.00	0.00	0.05	0.04
Rubber	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.14	0.00	0.00	0.00	0.00
Other waste	0.10	0.05	0.03	0.03	3.41	2.22	0.04	0.03	0.94	0.79	0.00	0.00



Metal (MMet)
Other waste (Owas)
Plastic (PPla)
Rubber (RRub)
Textiles (TTex)
Wood (WWoo)

Figure 4: Categories of marine litter by mass. Percentage in weight including all hauls within each period by depth strata.

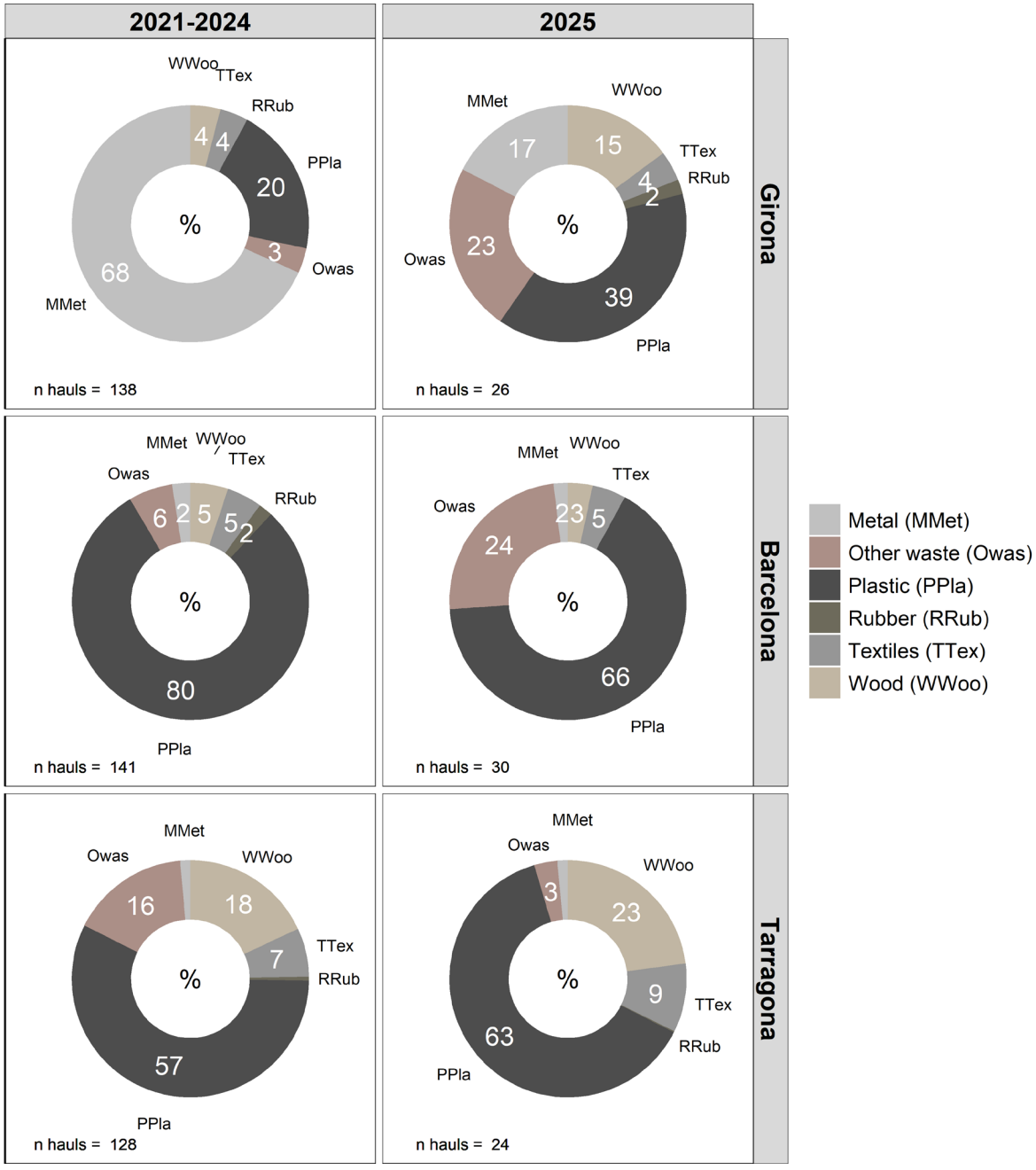


Figure 5: Categories of marine litter by mass. Percentage in weight including all hauls within each period by zone.

Table 4: Marine litter mass for the previous 4 years (2021-2024) and for the zone analyzed (2025) by zone. SE: standard error.

2021-2024 Marine litter mass (kg km^{-2})	Girona		Barcelona		Tarragona	
Type	Mean	SE	Mean	SE	Mean	SE
Plastic	2.40	0.54	7.59	1.55	1.77	0.66
Wood	0.48	0.18	0.49	0.24	0.56	0.20
Textiles	0.46	0.11	0.46	0.09	0.21	0.05
Metal	8.05	7.54	0.24	0.14	0.04	0.02
Rubber	0.00	0.00	0.18	0.10	0.02	0.01
Other waste	0.40	0.13	0.57	0.32	0.50	0.20
2025 Marine litter mass (kg km^{-2})	**Girona**		**Barcelona**		**Tarragona**	
Type	Mean	SE	Mean	SE	Mean	SE
Plastic	2.27	0.66	1.99	0.61	1.38	0.50
Wood	0.87	0.87	0.10	0.09	0.50	0.46
Textiles	0.24	0.22	0.14	0.06	0.21	0.13
Metal	1.02	1.02	0.06	0.04	0.03	0.03
Rubber	0.12	0.12	0.00	0.00	0.00	0.00
Other waste	1.35	0.85	0.73	0.69	0.07	0.03

Marine litter composition by port

This section contains information on the composition, in weight, of the marine litter fraction of the catch by port, for the 9 ports sampled (from north to south). For detailed data on the marine litter mass standardized by squared kilometer by port see Table 5.

(Figures 6 – 23. General catch composition and marine litter composition by port)

Roses

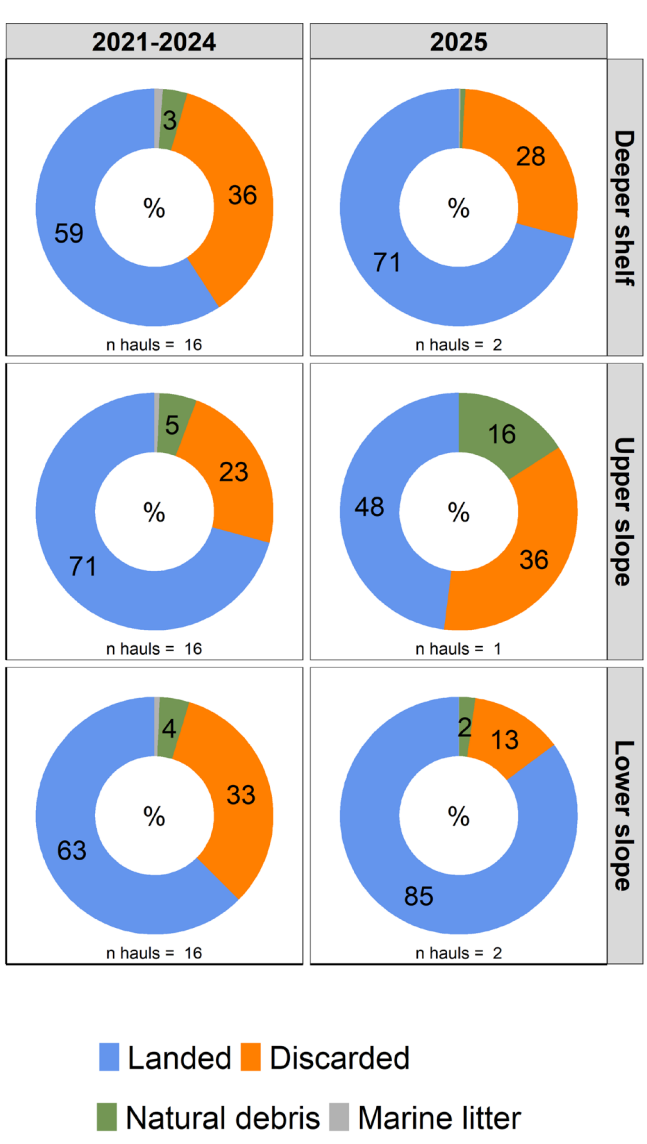


Figure 6: Catch composition in Roses. Percentage by weight of landings, discarded, natural debris and marine litter.

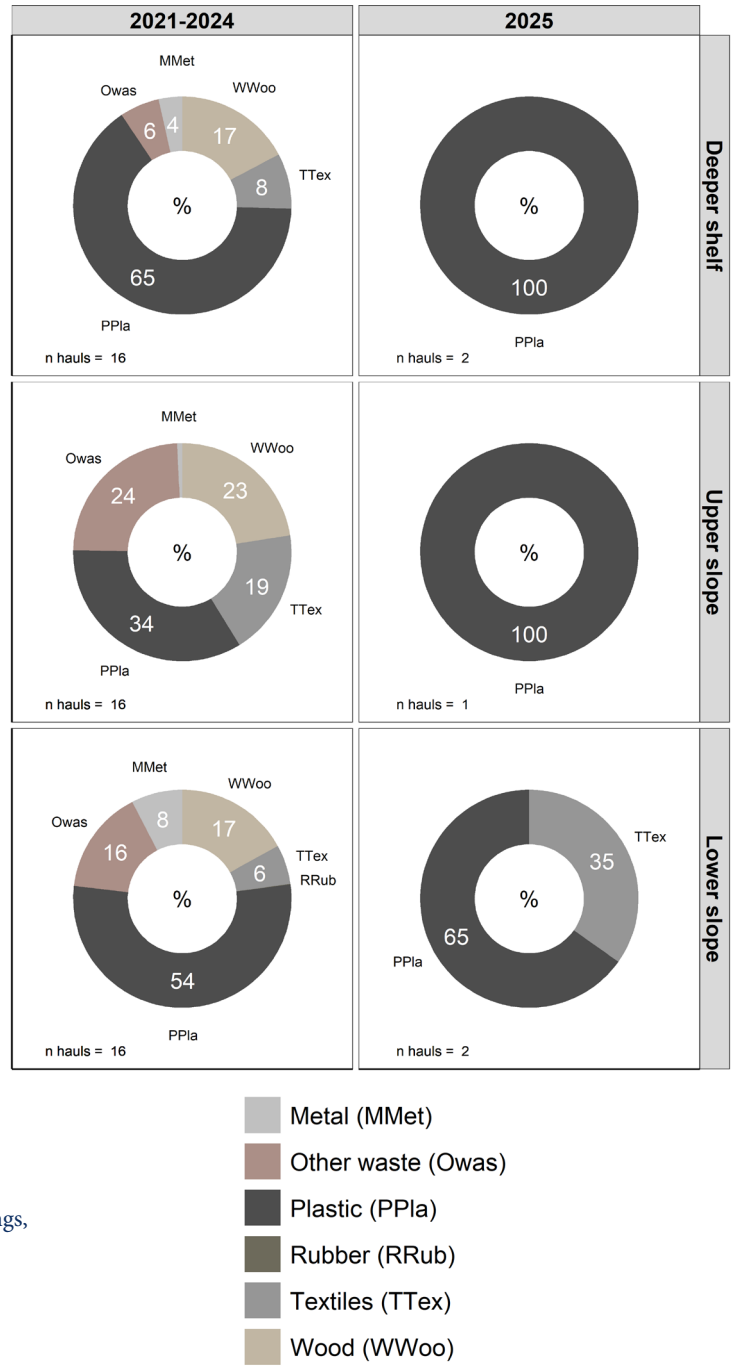


Figure 7: Categories of marine litter by mass at each depth including all hauls each year.

Palamós

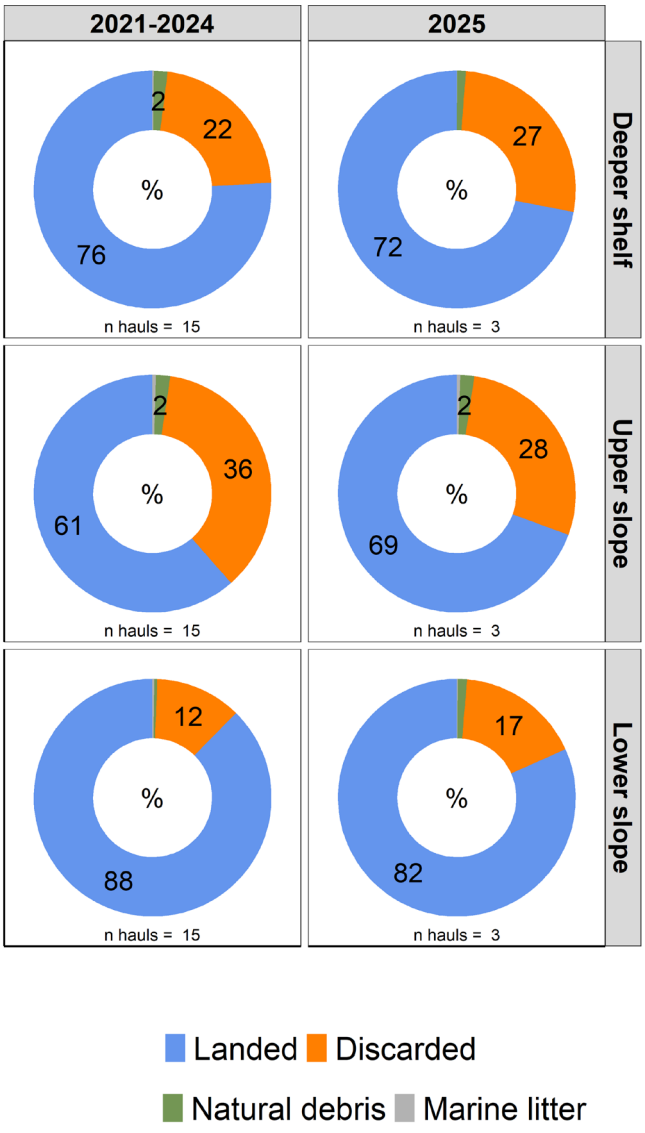


Figure 8: Catch composition in Palamós. Percentage by weight of landings, discarded, natural debris and marine litter.

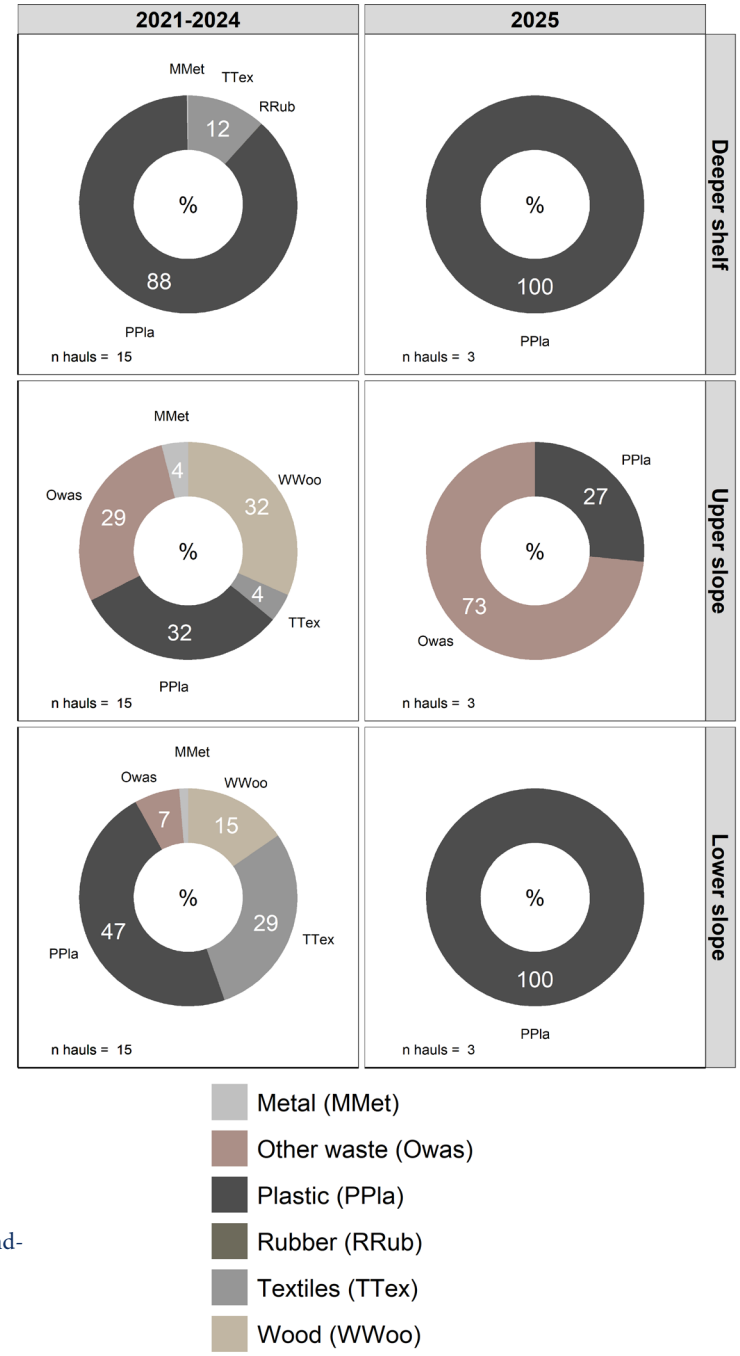


Figure 9: Categories of marine litter by mass at each depth including all hauls each year.

Blanes

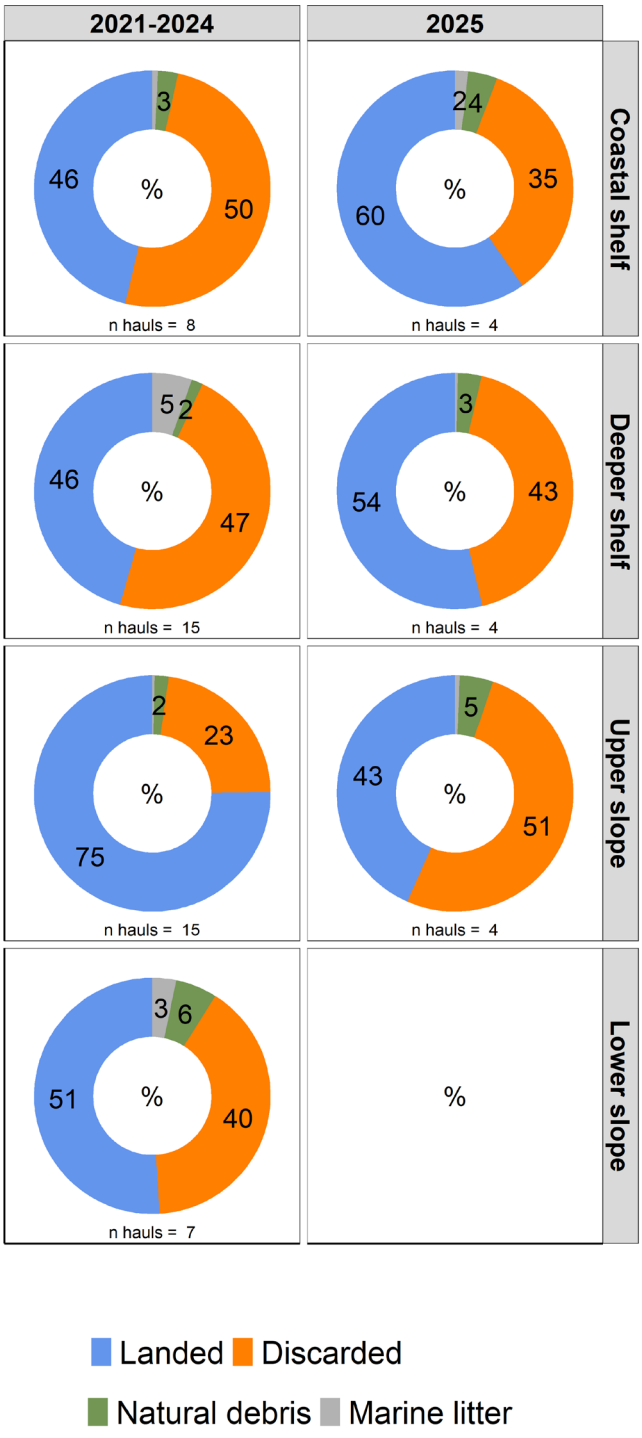


Figure 10: Catch composition in Blanes. Percentage by weight of landings, discarded, natural debris and marine litter.

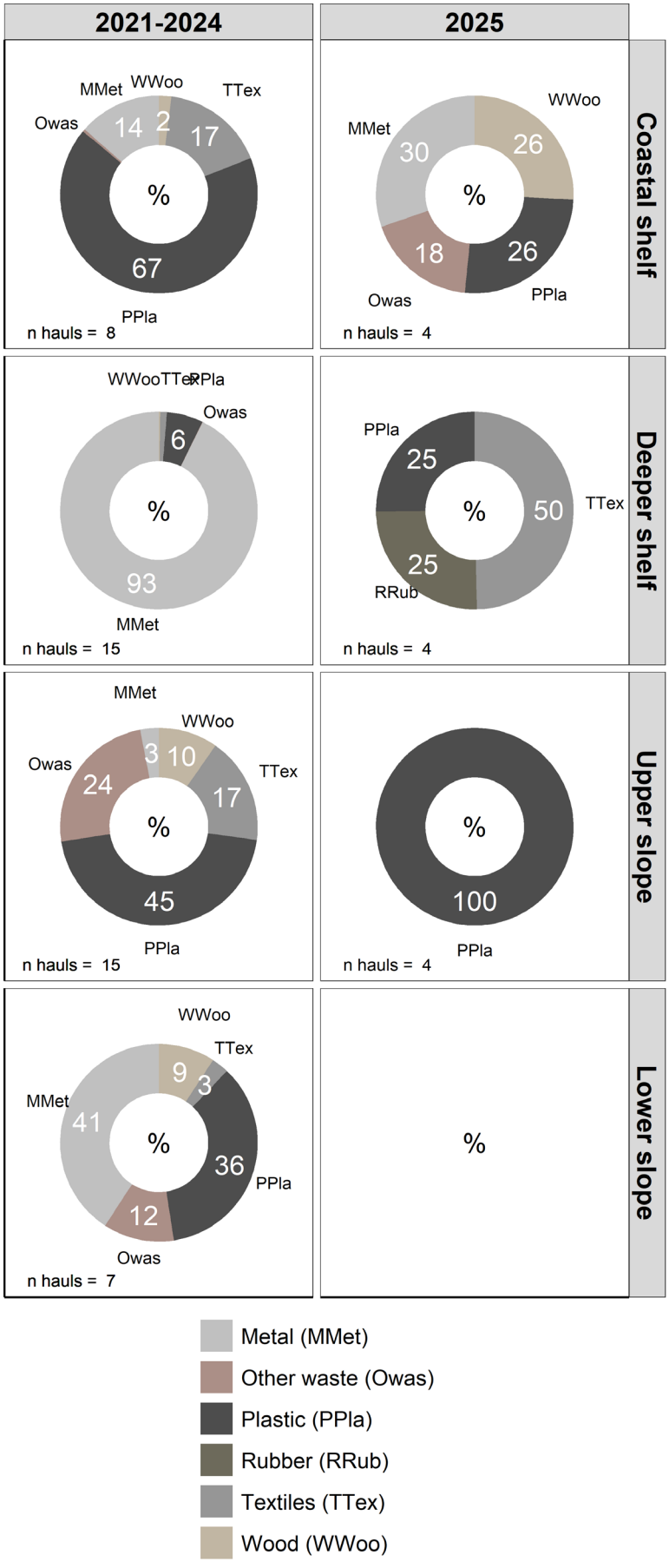


Figure 11: Categories of marine litter by mass at each depth including all hauls each year.

Arenys de Mar

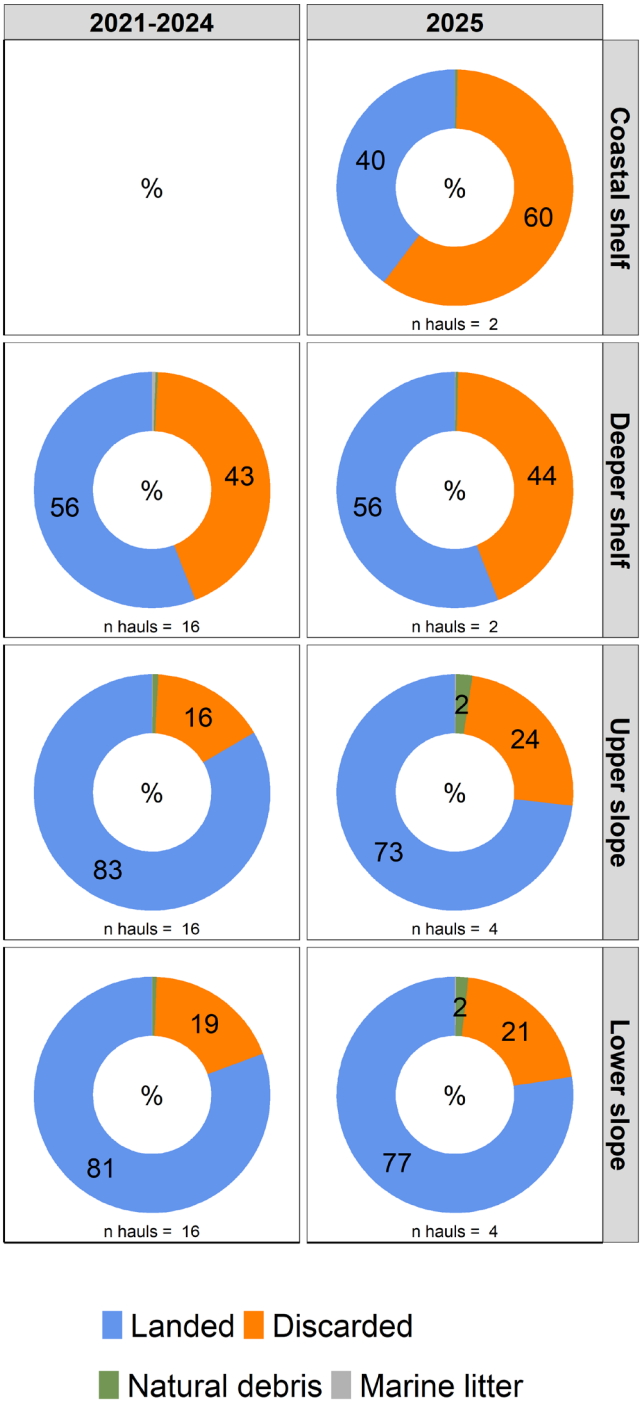


Figure 12: Catch composition in Arenys de Mar. Percentage by weight of landings, discarded, natural debris and marine litter.

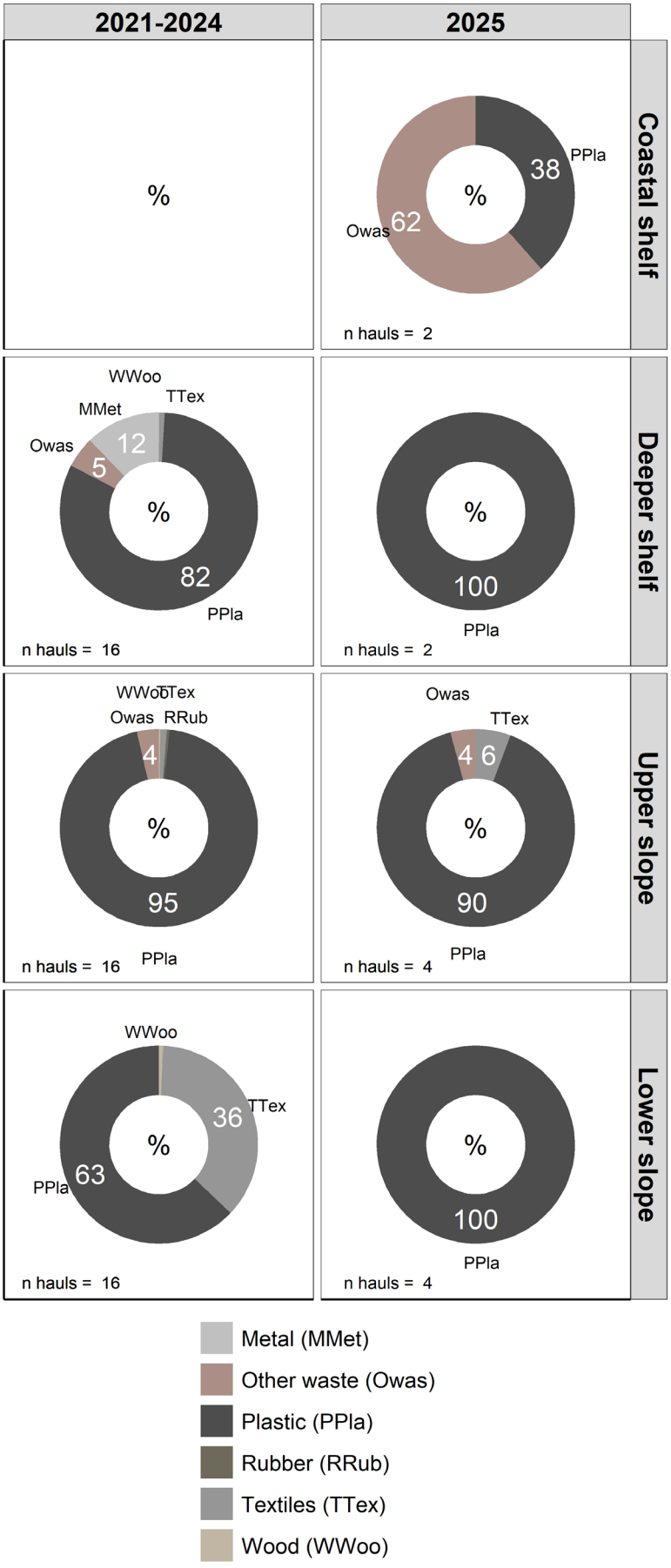


Figure 13: Categories of marine litter by mass at each depth including all hauls each year.

Barcelona

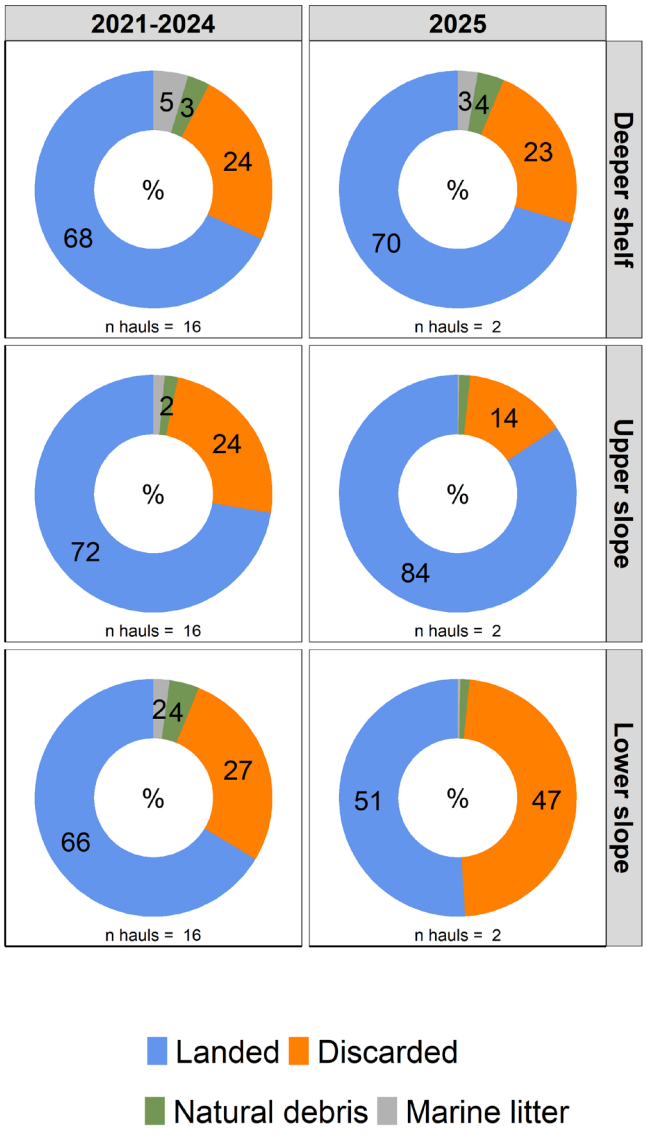


Figure 14: Catch composition in Barcelona. Percentage by weight of landings, discarded, natural debris and marine litter.

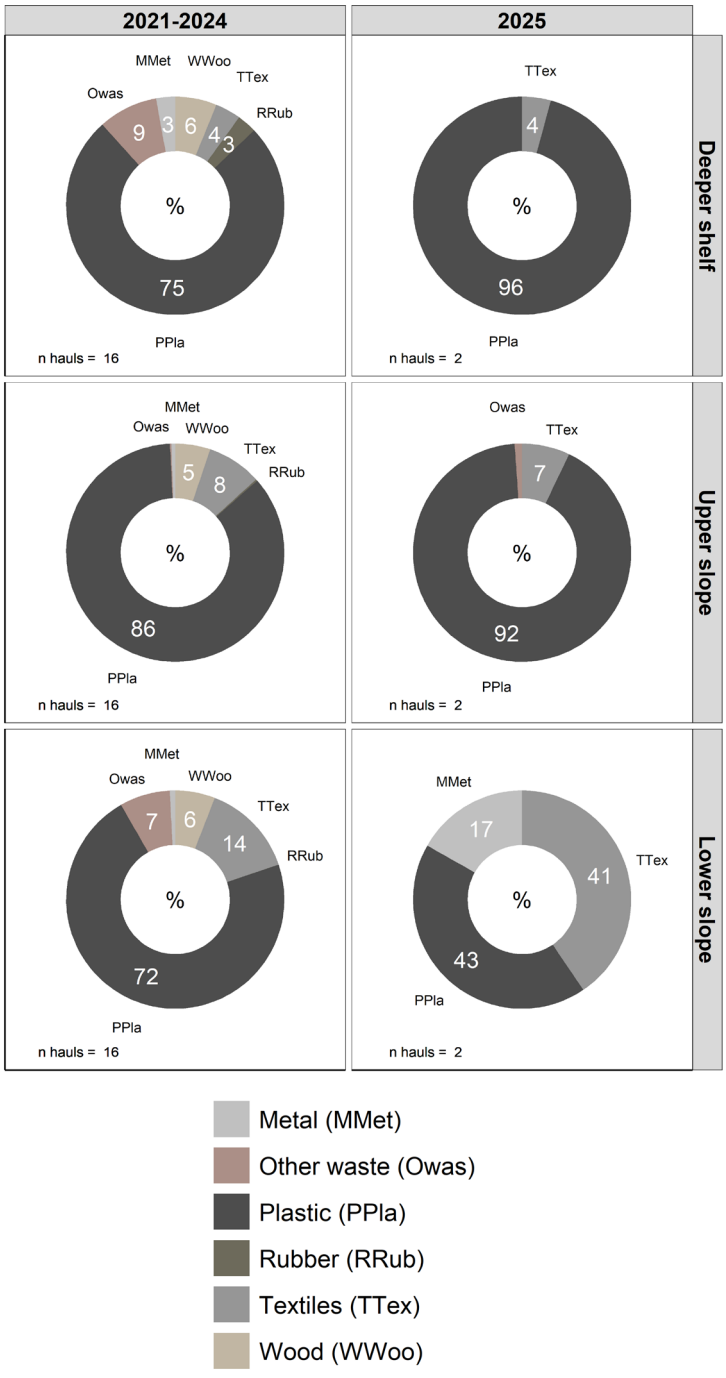


Figure 15: Categories of marine litter by mass at each depth including all hauls each year.

Vilanova i la Geltrú

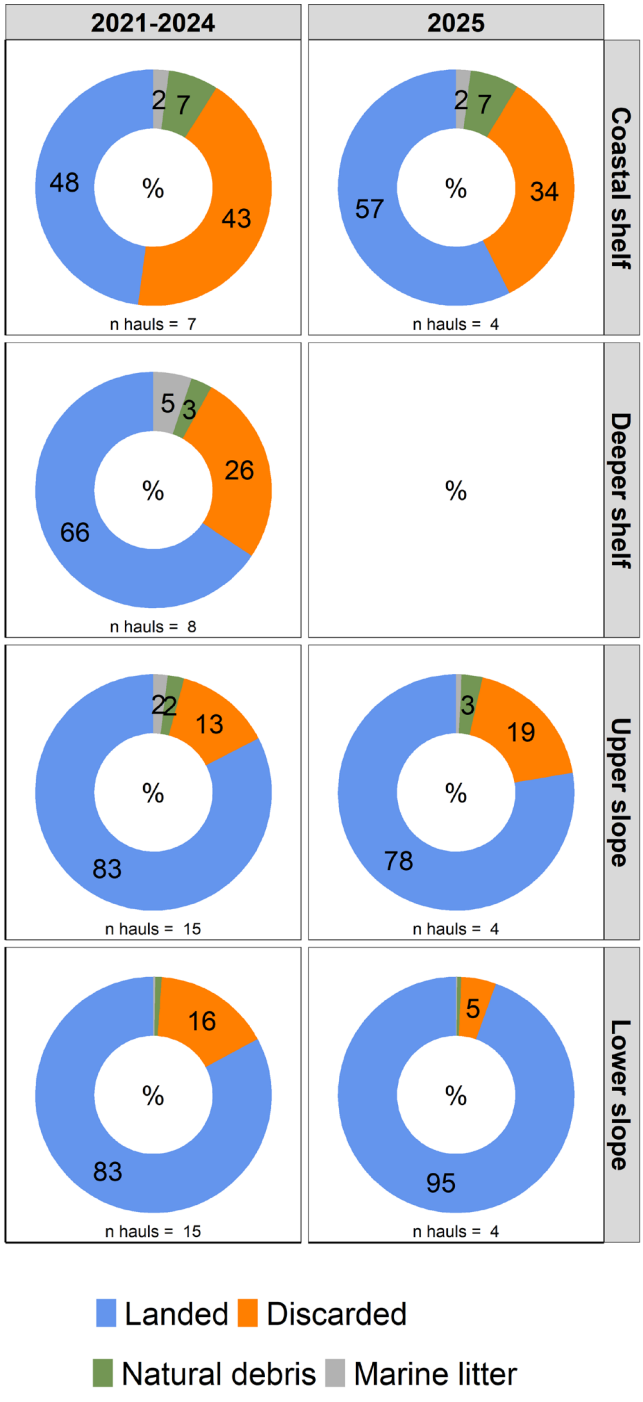


Figure 16: Catch composition in Vilanova i la Geltrú. Percentage by weight of landings, discarded, natural debris and marine litter.

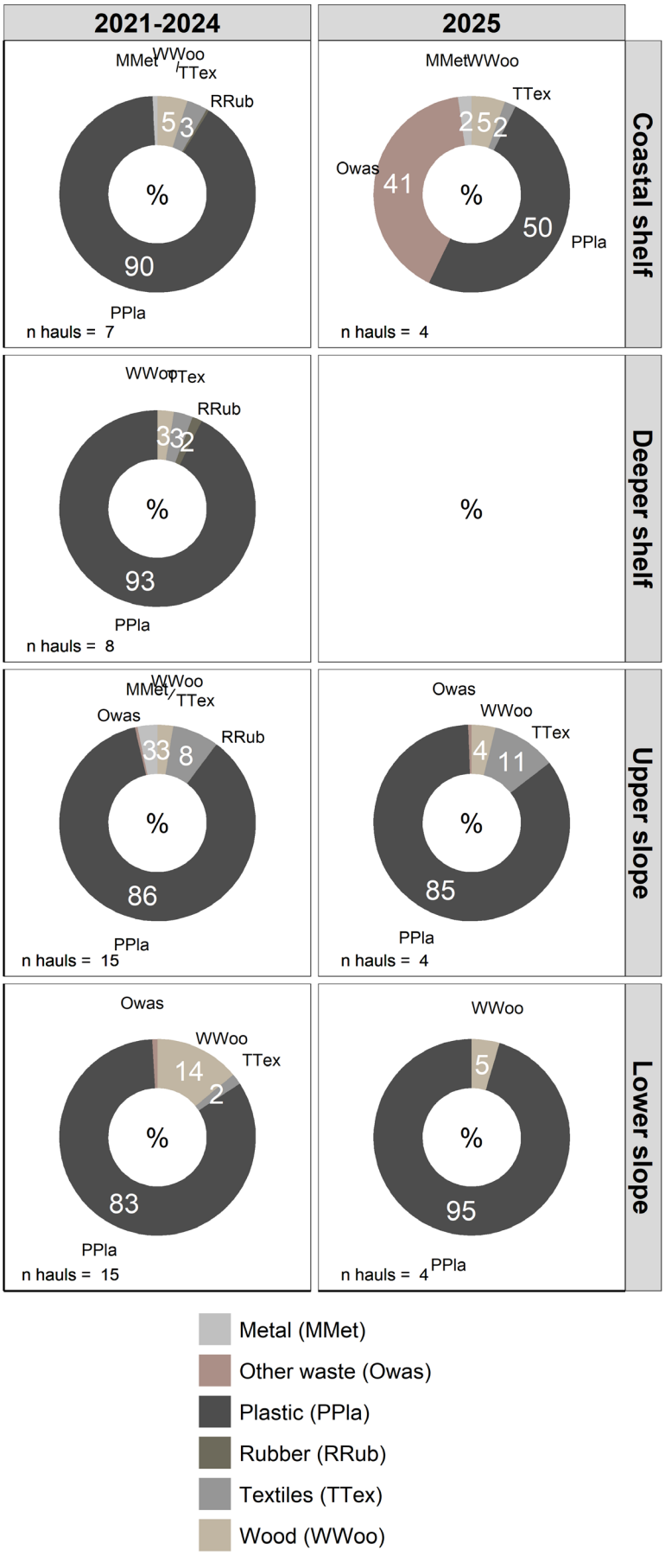


Figure 17: Categories of marine litter by mass at each depth including all hauls each year.

Tarragona/Cambrils

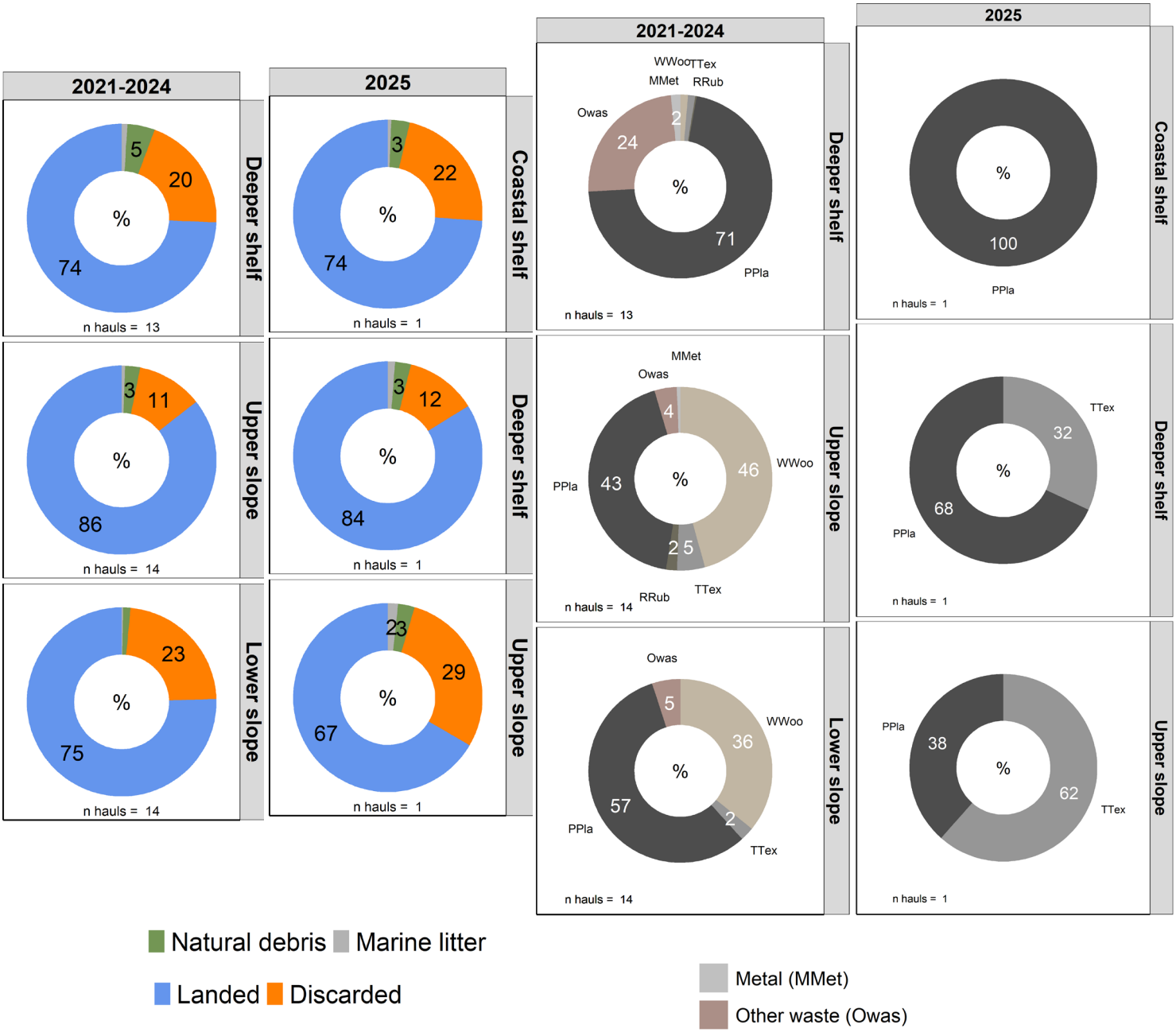


Figure 18: Catch composition in Tarragona (2021-2024) and Cambrils (2025). Percentage by weight of landings, discarded, natural debris and marine litter.

Figure 19: Categories of marine litter by mass at each depth including all hauls each year.

L'Ametlla de Mar

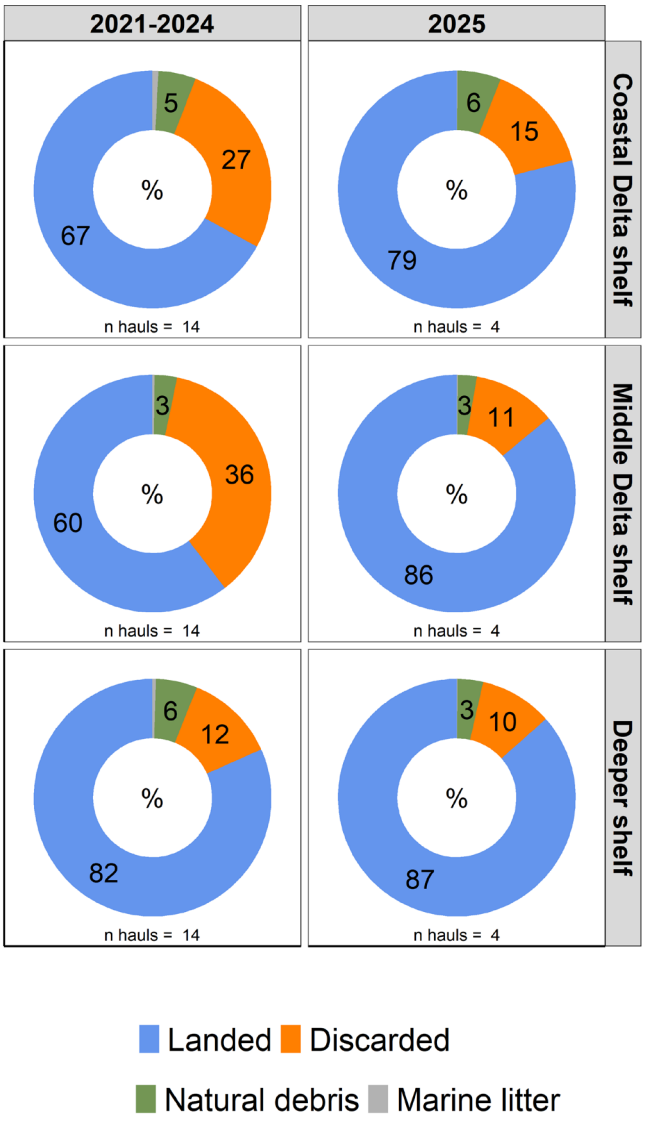


Figure 20: Catch composition in L'Ametlla de Mar. Percentage by weight of landings, discarded, natural debris and marine litter.

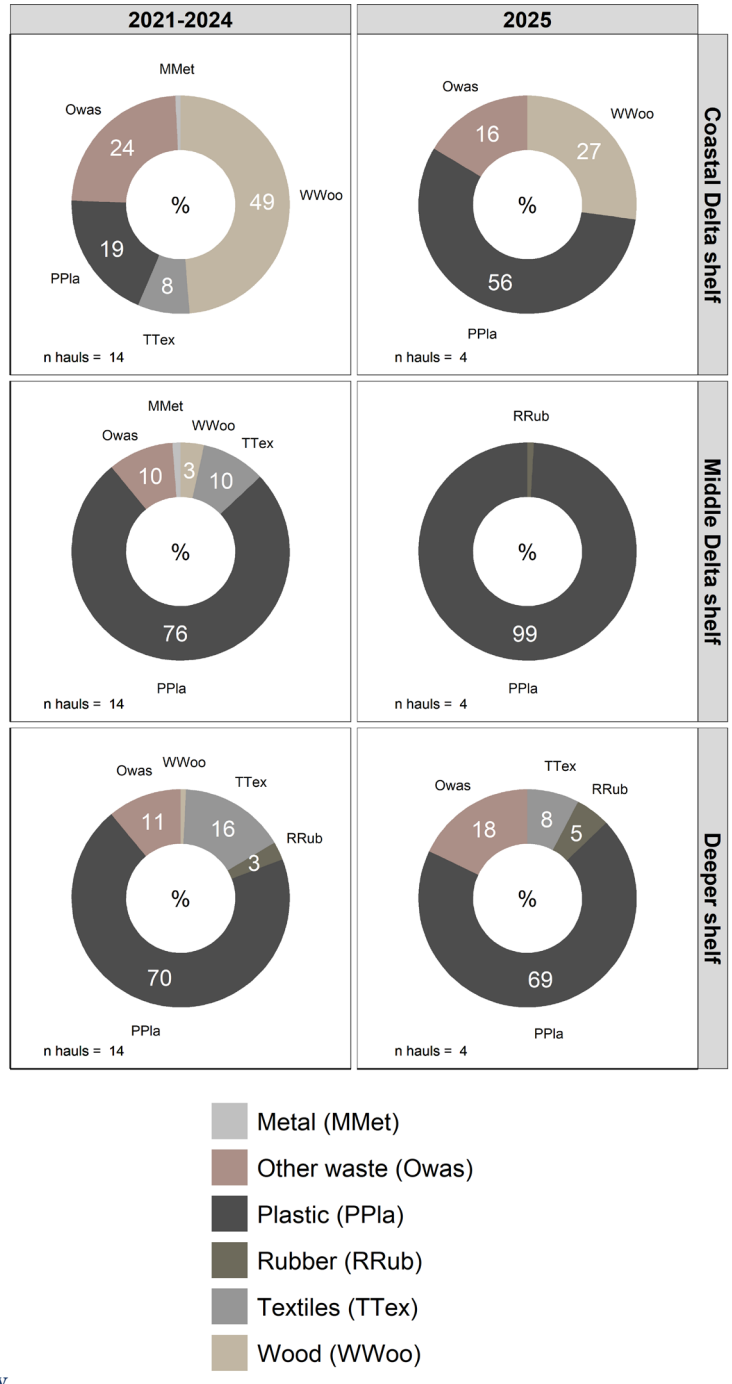


Figure 21: Categories of marine litter by mass at each depth including all hauls each year.

La Ràpita

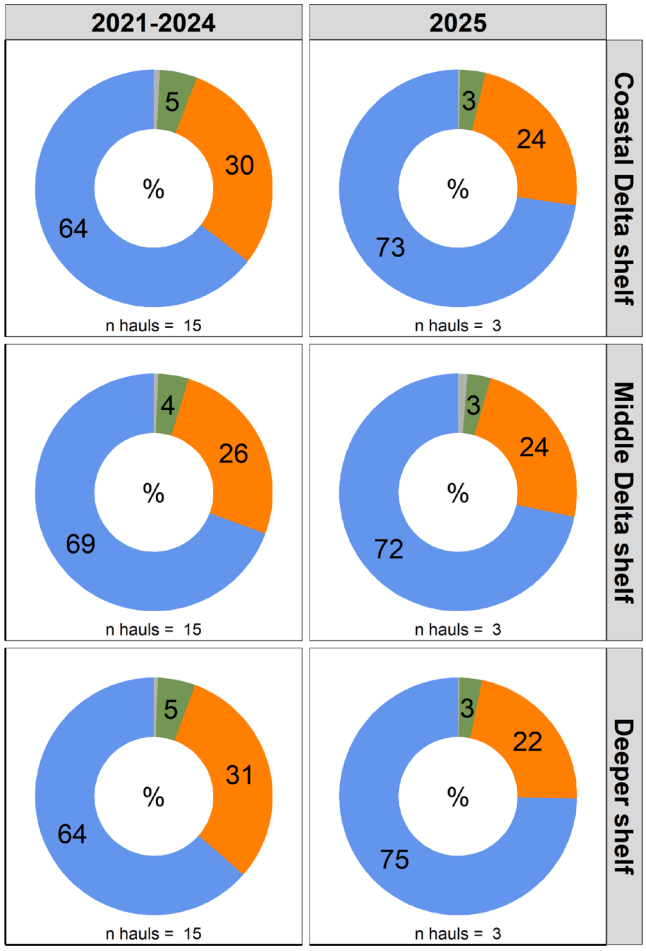


Figure 22: Catch composition in La Ràpita. Percentage by weight of landings, discarded, natural debris and marine litter.

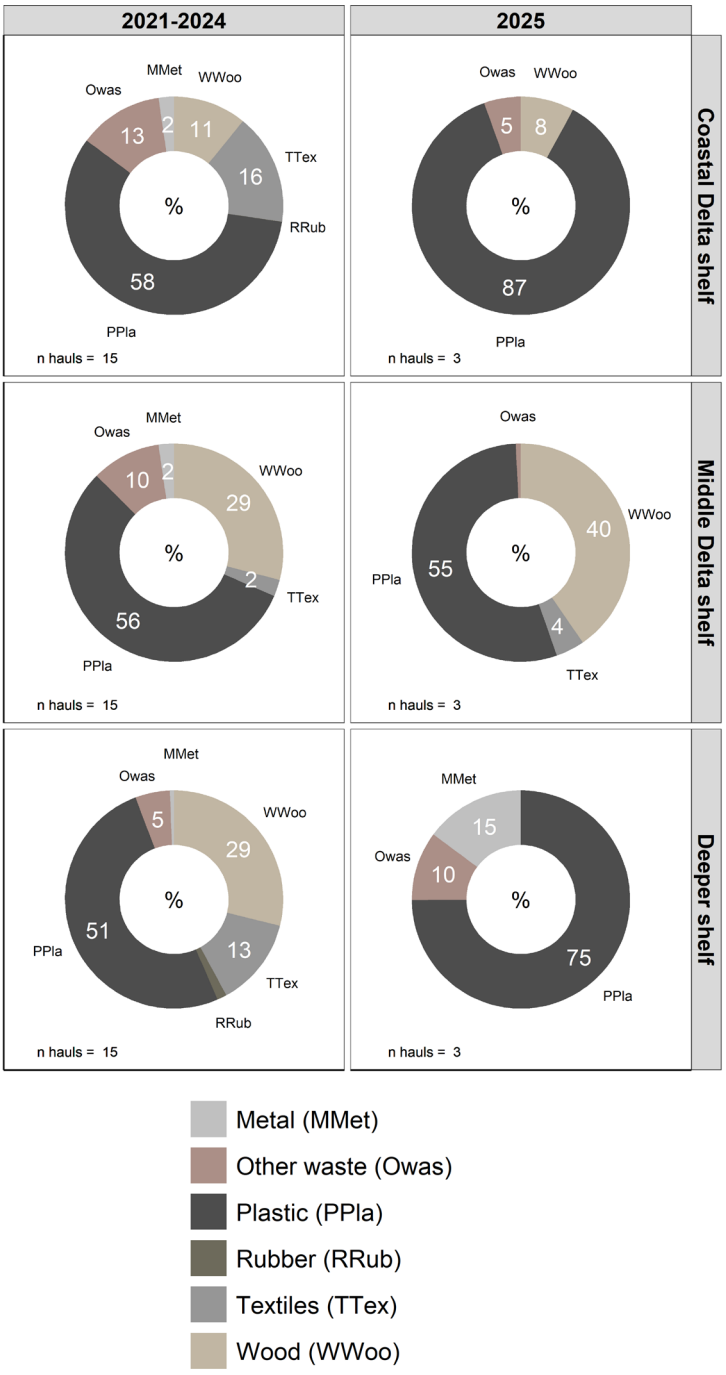


Figure 23: Categories of marine litter by mass at each depth including all hauls each year.

Table 5: Marine litter mass for the previous 4 years (2021-2024) and for the year analyzed (2025) by port. SE: standard error.

2021-2024 Marine litter mass (kg km^{-2})	Plastic		Wood		Metal		Textiles		Rubber		Other waste	
Port	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Roses	2.26	1.15	0.70	0.44	0.14	0.08	0.37	0.19	0.00	0.00	0.40	0.16
Palamós	0.55	0.13	0.30	0.20	0.04	0.04	0.10	0.04	0.00	0.00	0.26	0.18
Blanes	4.44	1.03	0.44	0.25	24.89	23.47	0.92	0.24	0.00	0.00	0.56	0.32
Arenys de Mar	1.35	1.11	0.00	0.00	0.19	0.18	0.03	0.01	0.00	0.00	0.08	0.08
Barcelona	14.83	3.73	1.17	0.64	0.46	0.35	1.04	0.22	0.45	0.27	1.53	0.88
Vilanova i la Geltrú	5.56	1.59	0.21	0.10	0.04	0.02	0.24	0.08	0.06	0.06	0.01	0.00
Tarragona	2.90	2.01	0.41	0.21	0.06	0.04	0.08	0.03	0.02	0.01	0.89	0.54
L'Ametlla de Mar	0.86	0.23	0.61	0.52	0.02	0.01	0.20	0.08	0.01	0.01	0.38	0.25
La Ràpita	1.57	0.29	0.65	0.24	0.05	0.02	0.32	0.12	0.02	0.02	0.26	0.14
2025 Marine litter mass (kg km^{-2})	**Plastic**		**Wood**		**Metal**		**Textiles**		**Rubber**		**Other waste**	
Port	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**
Roses	0.50	0.28	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00
Palamós	1.14	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.53	2.11
Blanes	3.67	1.16	1.74	1.74	2.04	2.04	0.47	0.45	0.24	0.24	1.22	1.22
Arenys de Mar	0.73	0.24	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.11	0.10
Barcelona	3.30	2.17	0.00	0.00	0.10	0.08	0.37	0.24	0.00	0.00	0.00	0.00
Vilanova i la Geltrú	2.28	0.84	0.23	0.21	0.09	0.07	0.11	0.07	0.00	0.00	1.55	1.55
Cambrils	1.58	0.25	0.00	0.00	0.00	0.00	1.22	0.82	0.00	0.00	0.00	0.00
L'Ametlla de Mar	0.41	0.10	0.06	0.06	0.00	0.00	0.01	0.01	0.01	0.01	0.05	0.03
La Ràpita	2.62	1.23	1.27	1.21	0.08	0.08	0.13	0.13	0.00	0.00	0.12	0.06

Conclusions

Marine litter is found globally in all waters. Accordingly, it is also found along the Catalan coast, at all studied depths and zones. Fishing for Litter strategies can provide useful information and help identify the type and location of the marine litter accidentally caught by bottom trawlers. Using this strategy, the main findings include:

• Marine litter represent the lowest fraction of the catch for bottom trawlers in the Catalan continental shelf, both historically and at present time;

• Plastic, despite comprising items that are often very lightweight, was the predominant category within the marine litter fraction. Its average density was 3.96 kg/km² during the 2021–2024 period, and 1.89 kg/km² in 2025. During 2021–2024, the metal category also showed an unusually high average density (2.83 kg/km²). This was largely attributed to the recovery of a large metal dumpster in Blanes in 2024, at the deeper shelf stratum. Nevertheless, despite this exceptional finding, plastic remained the most prevalent category of marine litter over the 2021–2024 period;

• When analyzed by port, the amount and type of marine litter varies along the coast. The greatest amounts, though, were observed in the central area of Catalonia, with the plastic fraction dominating the marine litter.

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